Claims:

1. An apparatus for permanently measuring wellbore or formation parameters, comprising:

a casing string permanently located within a wellbore; and

at least one optical sensor attached to the casing string, the at least one optical sensor capable of measuring one or more wellbore or formation parameters.

2. The apparatus of claim 1, wherein the at least one optical sensor is attached to an outer surface of the casing string.

3. The apparatus of claim 1, wherein the at least one optical sensor is attached to an inner surface of the casing string.

4. The apparatus of claim 1, wherein the at least one optical sensor is attached to the casing string by welding.

5. The apparatus of claim 1, wherein the at least one optical sensor is attached to the casing string by at least one sensor carrier, the at least one optical sensor disposed within the at least one sensor carrier.

6. The apparatus of claim 5, wherein the at least one optical sensor is attached to the casing string by welding the at least one sensor carrier to the casing string.

7. The apparatus of claim 5, wherein the at least one optical sensor is attached to the casing string by firmly clamping the at least one sensor carrier to the casing string.

8. The apparatus of claim 1, wherein at least a portion of the casing string comprises a protective pocket attached thereto, and wherein the at least one optical sensor is attached to the casing string by location within the protective pocket.

9. The apparatus of claim 8, wherein the protective pocket is disposed around an outer surface of the casing string.

10. The apparatus of claim 8, wherein the protective pocket is disposed around an inner surface of the casing string.

11. The apparatus of claim 8, wherein the protective pocket is disposed around the casing string by threaded connection.

12. The apparatus of claim 8, wherein the protective pocket is disposed around the casing string by welding.

13. The apparatus of claim 1, wherein the one or more wellbore or formation parameters comprises pressure, temperature, seismic conditions, acoustics, fluid composition within a formation, or combinations thereof.

14. The apparatus of claim 1, wherein a plurality of optical sensors are attached to the casing string.

15. The apparatus of claim 14, wherein the plurality of optical sensors attached to the casing string comprise a flow meter.

16. The apparatus of claim 14, wherein the one or more wellbore parameters are used to calculate flow rate of drilling fluid flowing through the casing string, one or more component fractions of components present in the drilling fluid, or combinations thereof.

17. An apparatus for permanently measuring wellbore or formation parameters, comprising:

a casing string permanently located within a wellbore; and

at least one optical sensor located at least partially within a wall of the casing string, the at least one optical sensor capable of measuring one or more wellbore or formation parameters.

18. The apparatus of claim 17, further comprising an optical cable located within the wall of the casing string, the optical cable connecting the at least one optical sensor to a signal interface.

19. The apparatus of claim 17, wherein the at least one optical sensor is located completely within the wall of the casing string.

20. The apparatus of claim 17, wherein the one or more wellbore or formation parameters comprises pressure, temperature, seismic conditions, acoustics, flow rate of drilling fluid, component fractions of components present in the drilling fluid, fluid composition within a formation, or combinations thereof.

21. The apparatus of claim 17, wherein a plurality of optical sensors are located at least partially within the wall of the casing string.

22. The apparatus of claim 21, wherein the plurality of optical sensors located at least partially within the wall of the casing string comprise a flow meter capable of measuring flow rate or component fractions of fluid flowing within the casing string.

23. A method of permanently monitoring wellbore or formation parameters, comprising:

providing a casing string having at least one optical sensor attached thereto;

locating the casing string within a wellbore; and

measuring one or more wellbore or formation parameters with the at least one optical sensor.

24. The method of claim 23, wherein locating the casing string within the wellbore comprises:

lowering the casing string into the wellbore; and

setting the casing string within the wellbore with a bonding material

25. The method of claim 23, wherein locating the casing string within the wellbore comprises:

introducing the casing string having an earth removal member operatively attached to its lower end into a formation; and

measuring one or more wellbore or formation parameters with the at least one optical sensor while drilling with the casing string.

26. The method of claim 23, further comprising transmitting the measured wellbore or formation parameters to a signal interface for processing into readable information via one or more optical fibers.

27. The method of claim 23, wherein the one or more wellbore or formation parameters comprises flow rate of fluid flowing through the casing string, component fractions of the fluid, pressure, temperature, seismic measurements, acoustic measurements, or combinations thereof.

28. The method of claim 23, wherein measuring one or more wellbore or formation parameters with the at least one optical sensor comprises:

introducing a tubular body having an earth removal member operatively attached to its lower end into the casing string; and

measuring one or more wellbore or formation parameters using the at least one optical sensor while drilling with the tubular body.

29. The method of claim 28, further comprising adjusting wellbore conditions based on the one or more wellbore or formation parameters while drilling with the tubular body.

30. The method of claim 29, wherein adjusting wellbore conditions comprises adjusting a flow rate of a drilling fluid while drilling.

31. The method of claim 29, wherein adjusting wellbore conditions comprises adjusting a composition of a drilling fluid while drilling.

32. The method of claim 28, further comprising altering a trajectory of the wellbore while drilling with the tubular body using the one or more wellbore or formation parameters.

33. The method of claim 23, wherein measuring one or more wellbore or formation parameters with the at least one optical sensor is accomplished during hydrocarbon production operations.

34. A method for determining a flow rate or one or more volumetric fractions of individual phases of a fluid flowing through a casing string, comprising:

locating a casing string having one or more optical sensors attached thereto within a wellbore;

measuring one or more parameters of the fluid flowing through the casing string with the one or more optical sensors; and

using the one or more parameters to determine the flow rate of the fluid or one or more volumetric fractions of the fluid.

35. The method of claim 34, wherein the one or more parameters comprises at least one of density, velocity, speed of sound, pressure, differential pressure, or temperature of the fluid.

36. The method of claim 34, wherein the one or more optical sensors comprises at least one of a pressure sensor, temperature sensor, differential pressure sensor, velocity sensor, or speed of sound sensor.

37. The method of claim 34, wherein the optical sensors are attached to the outer surface of the casing string.

38. The method of claim 34, wherein the fluid is drilling fluid.

39. The method of claim 38, wherein measuring parameters of the fluid with the one or more optical sensors comprises:

introducing a tubular body having an earth removal member operatively attached to its lower end into the casing string; and

measuring one or more fluid parameters using the one or more optical sensors while drilling with the tubular body.

40. The method of claim 38, further comprising adjusting the flow rate or composition of the drilling fluid based on the determined flow rate of the fluid or one or more volumetric fractions of the drilling fluid.

41. The method of claim 38, further comprising altering a trajectory of the wellbore while drilling with the tubular body based on the determined flow rate of the drilling fluid or one or more volumetric fractions of the drilling fluid.

42. The method of claim 34, further comprising setting the casing string within the wellbore using a bonding material prior to measuring one or more parameters of the fluid flowing through the casing string with the one or more optical sensors

43. An apparatus for measuring fluid flow through a casing string, comprising:

a casing string permanently located within a wellbore;

one or more optical sensors attached to the casing string for measuring parameters of a fluid flowing through the casing string; and

control circuitry and signal processing adapted to determine a composition of the fluid or flow rate of the fluid based on one or more signals received from the one or more optical sensors.

44. The apparatus of claim 42, wherein the one or more optical sensors are attached to an outer surface of the casing string.

45. The apparatus of claim 42, wherein a plurality of optical sensors are attached to the casing string.